

MegaFlex Scale-Up Cost & Risk Reduction for >50kW Future Power Demands, Phase I

Completed Technology Project (2014 - 2014)



Project Introduction

As the MegaFlex solar array is scaled for power demands greater than 50kW over the next 20 years and deployed load requirements remain high or increase, advanced MegaFlex blanket support spar designs will be desired. The spars are the structural members that support the MegaFlex solar array deployed blanket. When the solar array experiences a deployed load, the structural load path starts in the spars which carry the load to the hub assembly that then pass it on to the latched panel assemblies that act as the structural back-bone of the deployed array and carry the load to the solar array to spacecraft interface. Therefore as the MegaFlex blanket areas increase the spar loading increases which causes higher stress levels in the spars, unless they are appropriately scaled in size. However directly scaling the spars in size from their current design state is not the most optimized design for strength and mass. This is why AD proposes to develop a hierarchical set of MegaFlex spar designs with ATK. Successful performance of this proposed strategic plan has far reaching benefits which start with the scaling risk reduction of larger future MegaFlex solar arrays to support power demands beyond 50kW with high deployed loading requirements. The benefits continue with mass savings for these arrays obtained by the mass optimized future spars which will enable more payload for future HEOMD or other missions and or launch cost savings. Finally, development costs for future flight qualification of a MegaFlex solar array >50kW in size with high deployed loading requirements will be saved because this work will already have been completed. All of these benefits support future HEOMD missions and others, which therefore further validates the merit of the proposed innovation and work to be completed on this SBIR.

Primary U.S. Work Locations and Key Partners

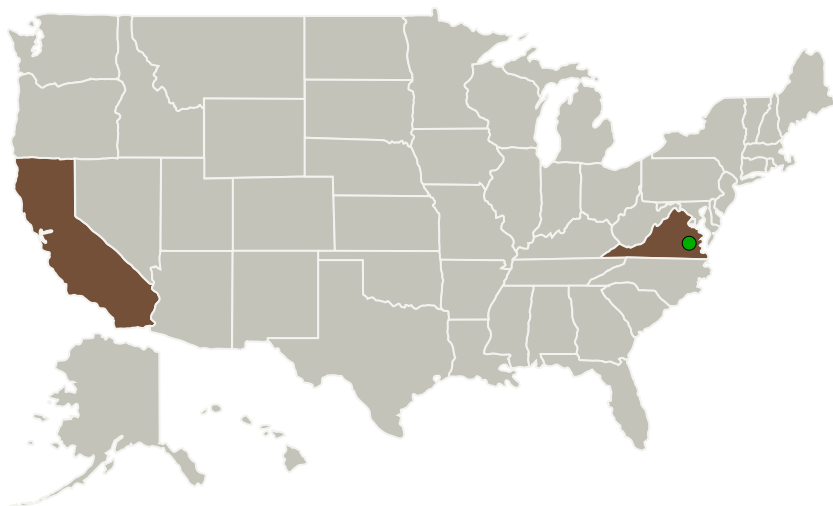


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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Angstrom Designs, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

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Organizations Performing Work	Role	Type	Location
Angstrom Designs, Inc.	Lead Organization	Industry	Santa Barbara, California
● Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations

California	Virginia
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Project Transitions

**June 2014:** Project Start**December 2014:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/137608>)

Images

Project Image

MegaFlex Scale-Up Cost & Risk Reduction for >50kW Future Power Demands Project Image
(<https://techport.nasa.gov/image/126867>)

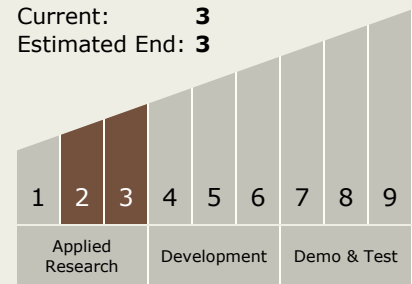
Project Management (cont.)

Principal Investigator:

Casey P Hare

Technology Maturity (TRL)

Start: 2
Current: 3
Estimated End: 3



Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
 - TX12.2 Structures
 - TX12.2.1 Lightweight Concepts

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System